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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/626,117 | 07/23/2003 | Michele J. Berry | 884.548US2 | 9523 |
| 21186 | 7590 | 12/20/2004 | EXAMINER | |
| SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 | | | THOMAS, TONIAE M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2822 | |

DATE MAILED: 12/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/626,117

Applicant(s)

BERRY, MICHELE J.

Examiner

Toniae M. Thomas

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-18, 20-28, 31-37 and 39-42 is/are rejected.
- 7) ☒ Claim(s) 19, 29, 30, 38 and 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>07/23/04, 12/08/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is a first Office action on the merits of Application Serial No. 10/626,117, which is a divisional of Application Serial No. 09/965,555.
2. The preliminary amendment filed on 23 July 2003 cancelled claims 1-13. Currently, claims 14-43 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. *Claims 14, 15, 18, 20, 23, 26, 31, 34-37, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Master (US 6,229,207 B1) in view of Bross et al. (5,303,862).¹*

Master discloses a microelectronic device (fig. 3 and accompanying text). The device comprises: a package substrate 42 having pin contact pads 52 on a first surface thereof (fig. 3 and col. 5, lines 46-63); a plurality of individual pins 54 soldered to the respective individual pin contact pads on the first surface of the package substrate (fig. 3 and col. 5, lines 46-63); and a microelectronic die 40 connected to the package substrate, the microelectronic die having bond

¹ Applicant submitted the Bross et al. patent as prior art.

pads 48 that are conductively coupled to the individual pins through the package substrate (fig. 3 and col. 5, lines 46-63).

Master lacks anticipation of a separate portion of encapsulation material surrounding a solder joint associated with each of the individual pins. The Bross et al. patent (Bross) discloses a microelectronic device (figs. 1a, 1b, and accompanying text). The microelectronic device comprises: a package substrate 5 having pin contact pads 6 on a first surface thereof (fig. 1b and col. 3, lines 58-61); a plurality of individual pins 2 soldered to the respective individual pin contact pads on the first surface of the package substrate (fig. 1b and col. 3, lines 26-28); a separate portion of encapsulation material 3 surrounding a solder joint associated with each of the individual pins (fig. 1b and col. 3, lines 43-51). The encapsulation material includes a polymer material (col. 3, lines 43-51). The polymer material comprises a cured polymer material (col. 4, lines 3-5).

Since both Master and Bross are from the same field of endeavor, the purpose for which Bross is being relied upon would have been recognized in the pertinent art of Master by one of ordinary skill in the art at the time the invention was made.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Master by having a separate portion of encapsulation material surrounding a solder joint associated with each of said individual pins, as taught by Bross, because the encapsulation material

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protects the solder which connects the pins to the pads (Bross - col. 4, lines 42-44).

4. *Claims 17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Master and Bross as applied to claims 14 and 18 above, respectively, and further in view of Bronson et al. (US 5,288,944).²*

Master does not teach that the encapsulation material is selected from the group consisting of one or more of epoxy materials, polyimide materials, SPARK®, Dow Chemical BCB, Cvclovene®, Dexter CNB 868-10, SEC 5230.1P or 5114, and an injection molding compound, in any combination. Bronson discloses a microelectronic device (fig. 2 and accompanying text). The device comprises a separate portion of encapsulation material 200 surrounding a solder joint associated with each of said individual pins 170 (fig. 2 and col. 8, lines 43-47). The encapsulation material is an epoxy resin such as cyclohexyldiepoxy resin (col. 8, lines 43-47).

Since both Master and Bronson are from the same field of endeavor, the purpose for which Bronson is being relied upon would have been recognized in the pertinent art of Master by one of ordinary skill in the art at the time the invention was made.

As discussed above, Bross discloses a separate portion of encapsulation material surrounding solder joint associated with individual pins, the encapsulation material comprising a polymer material. It would have been

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obvious to one of ordinary skill in the art, at the time the invention was made, to modify the combination of Master and Bross by using an epoxy resin for the encapsulation material, since epoxy resins such as cyclohexyldiepoxy resin are polymers.

5. *Claims 16, 21, 24, 25, 27, 28, 32, 33, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Master and Bross as applied to claims 14, 18, 31, and 37 above, and further in view of Elenius et al. (US 6,578,755 B1).*

Master does not teach that: the encapsulation material includes a no flow material; the polymer material has fluxing capabilities; or that the polymer material is selected from the group consisting of one or more of Cookson 2071E, Questech EF71 or LF-8, Advanced Polymer Solutions (APS) UFR 1.0 to 1.5, Kester Solder SE-CURE® 9101, Emerson & Cuming RTP-100-1, Sumotomo CRP 4700, and Loctite FF2000 and FF2200, in any combination. The Elenius et al. patent (Elenius) discloses an encapsulation material 26, 28 surrounding a solder ball 30, 32, wherein the encapsulation material includes a no-flow polymer with fluxing capabilities (fig. 2 and col. 5, lines 20-29; fig. 3 and col. 6, lines 37-41). The encapsulation material is a polymer material and is available from a number of suppliers including Emerson & Cumming, Kester, Loctite, and Dexter (col. 6, lines 8-15), which would include polymer materials selected from the group consisting of one or more of Cookson 2071E, Questech EF71 or LF-8, Advanced Polymer Solutions (APS) UFR 1.0 to 1.5,

² The Applicant submitted the Bronson et al. patent as prior art.

Kester Solder SE-CURE® 9101, Emerson & Cuming RTP-100-1, Sumotomo CRP 4700, and Loctite FF2000 and FF2200, in any combination.

Since both Master and Elenius are from the same field of endeavor, the purpose for which Elenius is being relied upon would have been recognized in the pertinent art of Master by one of ordinary skill in the art at the time the invention was made.

As discussed above, Bross discloses a separate portion of encapsulation material surrounding solder joint associated with individual pins, the encapsulation material comprising a polymer material. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the combination of Master and Bross by using an encapsulation material, as taught by Elenius, since the encapsulation material is a polymer.

Allowable Subject Matter

6. Claims 19, 29, 30, 38, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday-Thursday from 8:30 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MMJ

12 December 2004



Mary Wilczewski
Primary Examiner